

REMARKS

Entry of the foregoing and reconsideration of the subject matter identified in caption, as amended, pursuant to and consistent with 37 C.F.R. § 1.111, and in light of the remarks which follow, are respectfully requested.

By the above amendments, claims 1 and 35 have been amended to recite that the pillar ligand is pyrazine and that the organometallic complex structure is one of a plate-like crystal and a granular crystal. These amendments are supported by the specification, for example, page 33, 2nd paragraph and paragraph bridging pages 46 and 47, and original claims 20 and 27. Claims 18-20 and 27 have been canceled without prejudice or disclaimer. No new matter has been added.

Upon entry of the Amendment, claims 1-17, 21-26 and 28-41 will be all the claims pending in the application.

I. Response to Rejections under 35 U.S.C. § 102(b)

a. Claims 1, 4-6, 8-11, 18, 19, 28, 29, 35, 36 and 41 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,906,892 to Thompson. Applicants respectfully submit that the claims as amended are novel over Thompson for at least the following reasons.

Thompson is cited as disclosing a porous metal complex structure having metal ion, pillar ligands binding the metal ions, an organic polymer and a compound capable of binding to the metal ion, wherein the pillar ligand is bipyridinium. On the other hand, present claims 1 and 35 recite that the pillar ligand is pyrazine. As such, Thompson does not disclose or anticipate claims 1 and 35. Further, claims 4-6, 8-11, 28, 29, 36 and 41 depend, directly or indirectly, from claim 1 or 35. Accordingly, the Examiner is respectfully requested to reconsider and withdraw the rejection.

b. Claims 1, 4, 10, 11 and 13 were rejected under § 102(b) as being anticipated by Uemura et al., J. Am. Chem. Soc., 2003, 125, 7814-7815 ("Uemura JACS"). Applicants respectfully submit that the claims as amended are novel over Uemura JACS for at least the following reasons.

Uemura JACS is cited as disclosing an organometallic structure having an iron ion, an organic polymer, polyvinylpyrrolidone and CN ligands wherein the CN ligands function as pillar ligands. On the other hand, present claim 1 recites that the pillar ligand is pyrazine. As such, Uemura JACS does not disclose or anticipate claim 1. Further, claims 4, 10, 11 and 13 depend from claim 1. Accordingly, the Examiner is respectfully requested to reconsider and withdraw the rejection.

c. Claims 1-29 and 35-37 were rejected under 35 U.S.C. § 102(b) as being anticipated by Uemura et al., "Formation of a One-Dimensional Array of Oxygen in a Nonchannel of a Porous Coordination Polymer," Polymer Preprints, 2003, pp. 2837-2838, Vol. 52, No. 11 ("Uemura Poly Pre"). Applicants respectfully submit that the claims as amended are novel over Uemura Poly Pre for at least the following reasons.

Uemura Poly Pre is cited as disclosing a porous organometallic complex $[\text{Cu}_2(\text{pzdc})_2(\text{pyz})]$ as nanowires. On the other hand, present claims 1 and 35 recite that the organometallic complex structure is one of a plate-like crystal and a granular crystal. As such, Uemura Poly Pre does not disclose or anticipate claims 1 and 35. Further, claims 2-17, 21-26, 28, 29, 36 and 37 depend, directly or indirectly, from claim 1 or 35. Accordingly, the Examiner is respectfully requested to reconsider and withdraw the rejection.

II. Response to Rejections under 35 U.S.C. § 103(a)

a. Claims 38 and 41 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Uemura Poly Pre. Applicants respectfully submit that claims 38 and 41 are patentable over Uemura Poly Pre for at least the following reasons.

As noted above, Uemura Poly Pre discloses a porous organometallic complex $[\text{Cu}_2(\text{pzdc})_2(\text{pyz})]$ as nanowires. Uemura Poly Pre does not disclose or suggest an organometallic complex structure which is one of a plate-like crystal and a granular crystal, as recited in present claim 35. Claims 38 and 41 depend from claim 35. Accordingly, the Examiner is respectfully requested to reconsider and withdraw the rejection.

b. Claim 37 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Uemura Poly Pre in view of Uemura JACS. Applicants respectfully submit that claim 37 is patentable over the cited references for at least the following reasons.

As noted above, Uemura Poly Pre discloses a porous organometallic complex $[\text{Cu}_2(\text{pzdc})_2(\text{pyz})]$ as nanowires. Uemura Poly Pre does not disclose or suggest an organometallic complex structure which is one of a plate-like crystal and a granular crystal, as recited in present claim 35. Uemura JACS is cited merely as disclosing mixing a metal ion with the organic molecules in a ratio of 1:20 and thus does not rectify the above noted deficiencies of Uemura Poly Pre. As such, the combination of Uemura Poly Pre and Uemura JACS still would not result in the subject matter of claim 35, from which claim 37 depends. Accordingly, the Examiner is respectfully requested to reconsider and withdraw the rejection.

c. Claims 39 and 40 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Uemura Poly Pre in view of U.S. Patent No. 4,818,898 to Anderson. Applicants respectfully submit that claims 39 and 40 are patentable over the cited references for at least the following reasons.

As noted above, Uemura Poly Pre discloses a porous organometallic complex [Cu₂(pzdc)₂(pyz)] as nanowires. Uemura Poly Pre does not disclose or suggest an organometallic complex structure which is one of a plate-like crystal and a granular crystal, as recited in present claim 35. Anderson is cited merely as disclosing applying pressure on molding crystals and thus does not rectify the above noted deficiencies of Uemura Poly Pre. As such, the combination of Uemura Poly Pre and Anderson still would not result in the subject matter of claim 35, from which claims 39 and 40 depend. Accordingly, the Examiner is respectfully requested to reconsider and withdraw the rejection.

d. Claims 1-23, 27-29, 35, 36, 38 and 41 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kondo et al., Angew. Chem. Int. Ed. 1999, 38, in view of Moulton et al., Chem. Rev. 2001, 101, 1629. Applicants respectfully submit that the claims as amended are patentable over the cited references for at least the following reasons.

Kondo et al. is cited as disclosing complex [Cu₂(pzdc)₂(pyz)]_xH₂O. The Office Action concedes that Kondo et al. does not elaborate on the properties of crystalline structure; however, it asserts that “one of ordinary skill in the art would have known that the crystal structure of the organometallic complex structure taught in Kondo et al. would also be either plate-like, granular or wire-like” (page 10, paragraph 62 of the Office Action). Applicants respectfully disagree.

Specifically, Applicants advise that various shapes are possible depending on how to grow the crystal of the organometallic complex structure, which is not limited only by the types of pillar ligands. As such, Kondo et al. does not render obvious an organometallic complex structure of a plate-like crystal or a granular crystal.

Further, the Office Action concedes that Kondo et al. does not teach an organic polymer. Moulton et al. is cited merely as disclosing using coordination polymers to

engineer crystals networks and thus does not rectify the above noted deficiencies of Kondo et al. As such, the combination of Kondo et al. and Moulton et al. still would not result in the subject matter of claims 1 and 35. In addition, claims 2-17, 21-23, 28, 29, 36, 38 and 41 depend from claim 1 or 35. Accordingly, the Examiner is respectfully requested to reconsider and withdraw the rejection.

e. Claims 24-26 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kondo et al. in view of Moulton et al., and Millich et al., J. Phys. Chem. 1962, 66(6), 1070. Applicants respectfully submit that claims 24-26 are patentable over the cited references for at least the following reasons.

Kondo et al. is cited as disclosing complex $[\text{Cu}_2(\text{pzdc})_2(\text{pyz})]x\text{H}_2\text{O}$. The Office Action concedes that Kondo et al. does not elaborate on the properties of crystalline structure; however, it asserts that “one of ordinary skill in the art would have known that the crystal structure of the organometallic complex structure taught in Kondo et al. would also be either plate-like, granular or wire-like” (page 10, paragraph 62 of the Office Action). Applicants respectfully disagree.

Specifically, Applicants advise that various shapes are possible depending on how to grow the crystal of the organometallic complex structure, which is not limited only by the types of pillar ligands. As such, Kondo et al. does not render obvious an organometallic complex structure of a plate-like crystal or a granular crystal.

Further, Moulton et al. is cited merely as disclosing using coordination polymers to engineer crystals networks. Millich et al. is cited merely as disclosing using polyvinylsulfonic acid (PVSA) in the interaction of metal ions, including Cu. As neither Moulton et al. nor Millich et al. rectifies the above noted deficiencies of Kondo et al., the combination of Kondo et al., Moulton et al. and Millich et al. still would not result in the

subject matter of claim 1, from which claims 24-26 depend, directly or indirectly.

Accordingly, the Examiner is respectfully requested to reconsider and withdraw the rejection.

f. Claims 1-23, 27-29, 35-38 and 41 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kondo et al. in view of Uemura JACS. Applicants respectfully submit that the claims as amended are patentable over the cited references for at least the following reasons.

Kondo et al. is cited as disclosing complex $[\text{Cu}_2(\text{pzdc})_2(\text{pyz})]x\text{H}_2\text{O}$. The Office Action concedes that Kondo et al. does not elaborate on the properties of crystalline structure; however, it asserts that “one of ordinary skill in the art would have known that the crystal structure of the organometallic complex structure taught in Kondo et al. would also be either plate-like, granular or wire-like” (page 10, paragraph 62 of the Office Action). Applicants respectfully disagree.

Specifically, Applicants advise that various shapes are possible depending on how to grow the crystal of the organometallic complex structure, which is not limited only by the types of pillar ligands. As such, Kondo et al. does not render obvious an organometallic complex structure of a plate-like crystal or a granular crystal.

Uemura JACS is cited merely as disclosing using an organic polymer to form an organometallic structure and thus does not rectify the above noted deficiencies of Kondo et al. As such, the combination of Kondo et al. and Uemura JACS still would not result in the subject matter of claims 1 and 35. In addition, claims 2-17, 21-23, 28, 29, 36-38 and 41 depend from claim 1 or 35. Accordingly, the Examiner is respectfully requested to reconsider and withdraw the rejection.

g. Claim 37 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Kondo et al. and Moulton et al. in view of Uemura JACS. Applicants respectfully submit that claim 37 is patentable over the cited references for at least the following reasons.

Kondo et al. is cited as disclosing complex $[\text{Cu}_2(\text{pzdc})_2(\text{pyz})]x\text{H}_2\text{O}$. The Office Action concedes that Kondo et al. does not elaborate on the properties of crystalline structure; however, it asserts that “one of ordinary skill in the art would have known that the crystal structure of the organometallic complex structure taught in Kondo et al. would also be either plate-like, granular or wire-like” (page 10, paragraph 62 of the Office Action). Applicants respectfully disagree.

Specifically, Applicants advise that various shapes are possible depending on how to grow the crystal of the organometallic complex structure, which is not limited only by the types of pillar ligands. As such, Kondo et al. does not render obvious an organometallic complex structure of a plate-like crystal or a granular crystal.

Further, Moulton et al. is cited merely as disclosing using coordination polymers to engineer crystals networks. Uemura JACS is cited merely as disclosing mixing a metal ion with the organic molecules in a ratio of 1:20. As neither Moulton et al. nor Uemura JACS rectifies the above noted deficiencies of Kondo et al., the combination of Kondo et al., Moulton et al. and Uemura JACS still would not result in the subject matter of claim 35, from which claim 37 depends. Accordingly, the Examiner is respectfully requested to reconsider and withdraw the rejection.

h. Claims 39 and 40 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kondo et al. and Moulton et al. in view of Anderson. Applicants respectfully submit that claims 39 and 40 are patentable over the cited references for at least the following reasons.

Kondo et al. is cited as disclosing complex $[\text{Cu}_2(\text{pzdc})_2(\text{pyz})]x\text{H}_2\text{O}$. The Office Action concedes that Kondo et al. does not elaborate on the properties of crystalline structure; however, it asserts that “one of ordinary skill in the art would have known that the crystal structure of the organometallic complex structure taught in Kondo et al. would also be either plate-like, granular or wire-like” (page 10, paragraph 62 of the Office Action). Applicants respectfully disagree.

Specifically, Applicants advise that various shapes are possible depending on how to grow the crystal of the organometallic complex structure, which is not limited only by the types of pillar ligands. As such, Kondo et al. does not render obvious an organometallic complex structure of a plate-like crystal or a granular crystal.

Further, Moulton et al. is cited merely as disclosing using coordination polymers to engineer crystals networks. Anderson is cited merely as disclosing applying pressure on molding crystals. As neither Moulton et al. nor Anderson rectifies the above noted deficiencies of Kondo et al., the combination of Kondo et al., Moulton et al. and Anderson still would not result in the subject matter of claim 35, from which claims 39 and 40 depend. Accordingly, the Examiner is respectfully requested to reconsider and withdraw the rejection.

i. Claims 1-29, 35, 36, 38 and 41 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kondo et al. in view of U.S. Patent No. 5,168,084 to Pellet. Applicants respectfully submit that the claims as amended are patentable over the cited references for at least the following reasons.

Kondo et al. is cited as disclosing complex $[\text{Cu}_2(\text{pzdc})_2(\text{pyz})]x\text{H}_2\text{O}$. The Office Action concedes that Kondo et al. does not elaborate on the properties of crystalline structure; however, it asserts that “one of ordinary skill in the art would have known that the crystal structure of the organometallic complex structure taught in Kondo et al. would also be either

plate-like, granular or wire-like" (page 10, paragraph 62 of the Office Action). Applicants respectfully disagree.

Specifically, Applicants advise that various shapes are possible depending on how to grow the crystal of the organometallic complex structure, which is not limited only by the types of pillar ligands. As such, Kondo et al. does not render obvious an organometallic complex structure of a plate-like crystal or a granular crystal.

Pellet is cited merely as disclosing adding an organic polymer to molecular sieve agglomerates and thus does not rectify the above noted deficiencies of Kondo et al. As such, the combination of Kondo et al. and Pellet still would not result in the subject matter of claims 1 and 35. In addition, claims 2-17, 21-26, 27-29, 36, 38 and 41 depend from claim 1 or 35, directly or indirectly. Accordingly, the Examiner is respectfully requested to reconsider and withdraw the rejection.

j. Claim 37 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Kondo et al. and Pellet in view of Uemura JACS. Applicants respectfully submit that claim 37 is patentable over the cited references for at least the following reasons.

Kondo et al. is cited as disclosing complex $[\text{Cu}_2(\text{pzdc})_2(\text{pyz})]_x\text{H}_2\text{O}$. The Office Action concedes that Kondo et al. does not elaborate on the properties of crystalline structure; however, it asserts that "one of ordinary skill in the art would have known that the crystal structure of the organometallic complex structure taught in Kondo et al. would also be either plate-like, granular or wire-like" (page 10, paragraph 62 of the Office Action). Applicants respectfully disagree.

Specifically, Applicants advise that various shapes are possible depending on how to grow the crystal of the organometallic complex structure, which is not limited only by the

types of pillar ligands. As such, Kondo et al. does not render obvious an organometallic complex structure of a plate-like crystal or a granular crystal.

Further, Pellet is cited merely as disclosing adding an organic polymer to molecular sieve agglomerates. Uemura JACS is cited merely as disclosing mixing a metal ion with the organic molecules in a ratio of 1:20. As neither Pellet nor Uemura JACS rectifies the above noted deficiencies of Kondo et al., the combination of Kondo et al., Pellet and Uemura JACS still would not result in the subject matter of claim 35, from which claim 37 depends.

Accordingly, the Examiner is respectfully requested to reconsider and withdraw the rejection.

k. Claims 39 and 40 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kondo et al. and Pellet in view of Anderson. Applicants respectfully submit that claims 39 and 40 are patentable over the cited references for at least the following reasons.

Kondo et al. is cited as disclosing complex $[\text{Cu}_2(\text{pzdc})_2(\text{pyz})]_x\text{H}_2\text{O}$. The Office Action concedes that Kondo et al. does not elaborate on the properties of crystalline structure; however, it asserts that “one of ordinary skill in the art would have known that the crystal structure of the organometallic complex structure taught in Kondo et al. would also be either plate-like, granular or wire-like” (page 10, paragraph 62 of the Office Action). Applicants respectfully disagree.

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Further, Pellet is cited merely as disclosing adding an organic polymer to molecular sieve agglomerates. Anderson is cited merely as disclosing applying pressure on molding

crystals. As neither Pellet nor Anderson rectifies the above noted deficiencies of Kondo et al., the combination of Kondo et al., Pellet and Anderson still would not result in the subject matter of claim 35, from which claims 39 and 40 depend. Accordingly, the Examiner is respectfully requested to reconsider and withdraw the rejection.

III. Conclusion

From the foregoing, further and favorable action in the form of a Notice of Allowance is believed to be next in order and such action is earnestly solicited. If there are any questions concerning this paper or the application in general, the Examiner is invited to telephone the undersigned at his earliest convenience.

Respectfully submitted,

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